VENICE MEETING ON FLUCTUATIONS IN SMALL COMPLEX SYSTEMS V

Istituto Veneto di Scienze, Lettere ed Arti
Palazzo Franchetti, Venezia
4th to 7th October 2021

SCOPE

At this meeting, we want to bring together scientists from the fields of statistical, biological and soft matter physics, to address and discuss novel aspects of the role of fluctuations in small systems ranging from individual protein molecules over living biological cells to the transport of tracers in porous media. In particular, on small scales new techniques in microscopy allow experimentalists to track the motion of particles as small as single proteins in living cells or to manipulate single DNA molecules. Concurrently computers have become ever more powerful, permitting simulations over previously unreached time and length scales. The wealth of new experimental and simulations data emerging from these methods also pose the need for novel theoretical approaches to understand the dynamics of systems on such scales. From a physics point of view this development is very exciting as it opens up new vistas in statistical physics, and to explore systems in which fluctuations and disorder become controlling elements.

This meeting brings together participants from leading international laboratories to discuss non-equilibrium and stochastic effects in small systems. Combining experts on experiments, simulations, and theory we are looking forward to another stimulating meeting in the very heart of the Serenissima, Venice.

Organisers:
Ralf Metzler, University of Potsdam
Gleb Oshanin, Sorbonne University, Paris
Flavio Seno, Department of Physics and Astronomy, University of Padova and Istituto Veneto
Attilio Stella, Department of Physics and Astronomy, University of Padua and Istituto Veneto

PROGRAMME

SUNDAY, 3RD OCTOBER
Spontaneous social afternoon and dinner for those participants who already arrived

MONDAY, 4TH OCTOBER	
9:00	FELIX RITORT *Maxwell demon for dissipation reduction*
9:30	Stanislav SHVARTSMAN *Stochastic dynamics of a transcriptional brake*
10:00	Vittoria SPOSINI *Random diffusivity models for diffusion in heterogeneous systems*
10:15	Coffee and Posters
11:00	Ana-Suncana SMITH *Effects of fluctuations of molecular recognition - from individual binding events to cellular activation*
11:30	Stefan EGELHAAF *Safety in numbers and joint escapes - colloidal dynamics in random potentials*
12:00	David MUKAMEL *Transport and condensation of driven tracers in a narrow channel*
12:30	Lunch
14:30	Matthias WEISS *Eavesdropping on dynamic signatures of living matter*
15:00	Carlos MEJIA – MONASTERIO *Diffusion and escape from polygonal channels: extreme values and geometric effects*
15:30	Nahuel FREITAS *Linear response in large deviations theory: a method to compute non-equilibrium distributions*
15:45	Coffee and Posters
16:30	Sabine KLAPP *Dynamical self-assembly of dipolar active Brownian particles*
17:00	Enrique ABAD *Diffusion in evolving domains: some subtleties and recent results*
17:30	Gorka MUNOZ – GIL *Machine learning approaches to anomalous diffusion data*
17:45	Michele CARAGLIO *Target search of active agents crossing high energy barriers*
18:00	Posters

SOCIAL DINNER MONDAY, 4TH OCTOBER
at Ristorante da Ignazio

TUESDAY, 5TH OCTOBER	
9:00	Christine SELHUBER – UNKEL *Crowding, migration, differentiation - how are they related to intracellular motion?*
9:30	Alberto IMPARATO *Interacting thermodynamic machines at the verge of a phase transition*
10:00	Gianluca TEZA *Exact coarse graining preserves entropy production out of equilibirium*
10:15	Coffee and Posters
11:00	Eli BARKAI *Packets of diffusing particles exhibit universal exponential tails*
11:30	Aljaz GODEC *Criticality in stochastic many-body systems: from cell adhesion to the Ising model (and back)*
12:00	Carlo MANZO *An anomalous competition: assessment of methods for anomalous diffusion through a community effort*
12:30	Lunch
14:30	Maciej LEWENSTEIN *Complexity in Simplicity: from phase separation in cells to small Hubbard-Holstein systems*
15:00	Caterina DE BACCO *Optimal transport in networks: a physics perspective*
15:30	Jakub ŚLĘZAK *Lévy flights stemming from heterogeneous energy transfer*
15:45	Coffee and Posters
16:30	Diego KRAPF *Spectral content of subordinated random walks: The case of membrane proteins*
17:00	Nikta FAKHRI *Irreversibility in living matter*
17:30	Stefano COPPOLA *Quantifying gene transcription kinetics by single molecule microscopy*
17:45	Alessio SQUARCINI *Spectral density of individual trajectories of an active Brownian particle*
18:00	Posters

NIGHT VISIT TUESDAY, 5TH OCTOBER
21:30 Night visit at San Marco

WEDNESDAY, 6TH OCTOBER	
9:00	Leonid MIRNY *Chromatin as a memory machine*
9:30	Enrico CARLON *Fluctuations in DNA supercoils*
10:00	Ohad VILK *Unravelling the origins of anomalous diffusion: from molecules to migrating storks*
10:15	Coffee and Posters
11:00	Igor SOKOLOV *Unusual convergence to a Gaussian of a diffusion profile in homogenizing strongly disordered systems*
11:30	Thomas FRANOSCH *Crowding-enhanced diffusion: An exact theory for highly entangled self-propelled stiff filaments*
12:00	Cristian MICHELETTI *Topological friction and relaxation dynamics of catenated polymers*
12:30	Lunch
14:30	Enzo ORLANDINI *Topological jamming in recombinant rings under confinement*
15:00	Baruch MEERSON *Fluctuations of a swarm of Brownian bees*
15:30	Sara CERASOLI *Spectral fingerprints of non-equilibrium dynamics*
15:45	Coffee and Posters
16:30	Florencia CARUSELA *Antiresonant driven systems for particle manipulation*
17:00	Olivier BENICHOU *Generalized density profiles in single-file systems*
17:30	Netta COHEN
17:45	*C. elegans: a microswimmer's exploration of 3D space*

18:00	Posters

THURSDAY, 7TH OCTOBER	
9:00	Carsten BETA Biohybrid active matter - the complex dance of motile cells with passive micro-cargo
9:30	Massimiliano ESPOSITO Chemical machines: From enzymes to metabolism
10:00	Samudrajith THAPA Bayesian inference of anomalous diffusion in single particle tracking experiments
10:15	Coffee and Posters
11:00	Yael ROICHMAN Tuning of effective temperature with random optical forces
11:30	Denis GREBENKOV Various aspects of diffusive search with multiple searchers
12:00	Fulvio BALDOVIN Polymers critical point originates Brownian non-Gaussian diffusion
12:30	Lunch
14:30	Barbara CAPONE Designing smart polymeric materials: when theory meets experiments
15:00	Christian BECK Superstatistical modelling of protein diffusion dynamics in bacteria
15:30	Antonio CIARLO Experimental study of Fickian yet-non Gaussian Diffusion in an optical speckle landscape
15:45	Coffee and Posters
16:30	Giovanni VOLPE Measuring Anomalous Diffusion with Deep Learning
17:00	Aleksei CHECHKIN Beyond Fractional Brownian Motion
17:30	Julian TALBOT
17:45	Statistics and optimisation of random pan stacking
18:00	Posters

POSTER SESSION

Marco BENEDETTI Università Roma La Sapienza, Italy	An Hopfield model with auxiliary hidden layers
Pietro CHIARANTONI and Matteo BECCHI SISSA, Trieste, Italy	xrRNA pore translocation: effect of secondary and tertiary elements on process activation and duration
Pietro CORSI Università di Roma Tre, Italy	Unveiling adsorption universality in polymeric macromolecules
Cai DIEBALL MPI Biophysical Chemistry, Göttingen, Germany	Coarse-graining empirical densities and currents at all times
Marcus DAHLENBURG BCAM Bilbao, Spain	Random amplitude stochastic resetting
Timo DÖRRIES Universität Potsdam, Germany	Rate equations and spatial moments for mobile-immobile models with power-law waiting time distributions
Gianmaria FALASCO Université de Luxembourg, Luxemburg	
Carlo Andrea DE FILIPPO Università di Roma Tre, Italy	On the role of polydispersity, elongation and functionalisation on the phase diagram of low density colloidal solutions
Simon Benedikt GROSSE-HOLZ MIT, USA	Bayesian inference of chromatin looping
David HARTICH MPI Biophysical Chemistry, Göttingen, Germany	How is anomalous diffusion compatible with thermodynamics and Transition paths in driven networks: Towards a thermodynamically consistent interpretation of memory
Jérémie KLINGER Sorbonne Université, Paris, France	Joint statistics of space and time exploration of 1D random walks
Sumanta KUNDU Università di Padova, Italy	Nonuniversal features in the random sequential adsorption in the presence of spatially long-range correlated disorder
Emanuele PENOCCHIO Université de Luxembourg, Luxemburg	Insights from an information thermodynamics analysis of a synthetic molecular motor
Henrik SECKLER Universität Potsdam, Germany	Using Bayesian Deep Learning for error prediction in classification/inference tasks of single particle anomalous diffusion trajectories
Luigi ZANOVELLO Università degli studi di Trento, Italy	

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